

What is Claimed is:

1. A timing regulator for regulating a gas flow to pass from a gas source to an outdoor gas apparatus, wherein said timing regulator comprises:

5 a valve body, which is constructed to obtain an operation temperature of said timing regulator from -40°C to 55°C for incorporating with said outdoor gas apparatus, having a gas inletting end, a gas discharging end for connecting to said outdoor gas apparatus, and a gas chamber communicating between said gas inletting end and said gas discharging end, wherein said valve body further comprises a safety gas connector provided at said gas inletting end for securely and sealedly connecting to said gas source;

10 a gas controller comprising a gas channel having a gas outlet communicating with said gas chamber and a gas inlet defining at said gas inletting end of said valve body, and a safety device disposed in said gas channel for blocking said gas flow passing from said gas inlet to said gas outlet when a gas pressure at said gas discharging end of said valve body is higher than a safety gas pressure at said gas inletting end thereof; and

15 a timer device disposed in said valve body for selectively regulating said gas flow via a preset time frame, wherein said timer device comprises:

a time gear assembly comprising an upper platform, a lower platform spacedly supported below said upper platform, and a gear unit supported between said upper and lower platforms to form a one piece integral time gear assembly;

20 a gas switch which is disposed within said gas chamber of said valve body and is operatively connected with said time gear assembly for controlling said gas flow through said gas chamber; and

a manual time switch which is rotatably supported on said valve body and is operatively connected with said gear unit of said time gear assembly, wherein said
25 manual time switch is arranged to actuate said gas switch through said gear unit for blocking said gas flow to pass through said gas chamber so as to shut off said valve body after said preset time frame.

2. The timing regulator, as recited in claim 1, wherein said safety gas connector is mounted at said gas inletting end of said valve body 10 for securely connecting with a gas vent of said gas source, wherein said safety gas connector has an inner threaded portion adapted for rotatably screwing with an outer threaded portion of said gas vent so as to securely connecting said valve body with said gas source.

3. The timing regulator, as recited in claim 1, wherein said valve body further comprises a thermal connector, having a predetermined thermal contracting ability, connected between said safety gas connector and said gas inletting end of said valve body, wherein said thermal connector is adapted to be deformed for disengaging said gas inletting end of said valve body with said gas source when an environmental temperature is higher than a thermal contracting temperature of said thermal connector.

4. The timing regulator, as recited in claim 2, wherein said valve body further comprises a thermal connector, having a predetermined thermal contracting ability, connected between said safety gas connector and said gas inletting end of said valve body, wherein said thermal connector is adapted to be deformed for disengaging said gas inletting end of said valve body with said gas source when an environmental temperature is higher than a thermal contracting temperature of said thermal connector.

5. The safety regulator, as recited in claim 3, wherein said thermal contracting temperature of said thermal connector is 240°F in such a manner that when said environmental temperature is higher than said thermal contracting temperature, said thermal connector is physically deformed to shut off said valve body.

6. The safety regulator, as recited in claim 4, wherein said thermal contracting temperature of said thermal connector is 240°F in such a manner that when said environmental temperature is higher than said thermal contracting temperature, said thermal connector is physically deformed to shut off said valve body.

7. The safety regulator, as recited in claim 1, wherein said valve body further comprises a gas flowing regulator for controlling said gas flow, wherein said gas flowing regulator comprises a pressurizing diaphragm movably sealing at said gas chamber and a gas valve which is operatively connected to said pressurizing diaphragm and is communicating said gas chamber with said gas outlet of said gas controller, in such a manner that while increasing said pressure at said gas discharging end of said valve body,

said pressurizing diaphragm is lifted to partially close said gas valve for reducing said gas flow to pass to said gas discharging end of said valve body, and while reducing said pressure gas discharging end of said valve body, said pressurizing diaphragm is sucked to partially open said gas valve for increasing said gas flow to pass to said gas discharging
5 end of said valve body.

8. The safety regulator, as recited in claim 3, wherein said valve body further comprises a gas flowing regulator for controlling said gas flow, wherein said gas flowing regulator comprises a pressurizing diaphragm movably sealing at said gas chamber and a gas valve which is operatively connected to said pressurizing diaphragm and is
10 communicating said gas chamber with said gas outlet of said gas controller, in such a manner that while increasing said pressure at said gas discharging end of said valve body, said pressurizing diaphragm is lifted to partially close said gas valve for reducing said gas flow to pass to said gas discharging end of said valve body, and while reducing said pressure gas discharging end of said valve body, said pressurizing diaphragm is sucked to
15 partially open said gas valve for increasing said gas flow to pass to said gas discharging end of said valve body.

9. The safety regulator, as recited in claim 6, wherein said valve body further comprises a gas flowing regulator for controlling said gas flow, wherein said gas flowing regulator comprises a pressurizing diaphragm movably sealing at said gas chamber and a
20 gas valve which is operatively connected to said pressurizing diaphragm and is communicating said gas chamber with said gas outlet of said gas controller, in such a manner that while increasing said pressure at said gas discharging end of said valve body, said pressurizing diaphragm is lifted to partially close said gas valve for reducing said gas flow to pass to said gas discharging end of said valve body, and while reducing said
25 pressure gas discharging end of said valve body, said pressurizing diaphragm is sucked to partially open said gas valve for increasing said gas flow to pass to said gas discharging end of said valve body.

10. The timing regulator, as recited in claim 1, wherein said safety device comprises a ball shaped gas stopper movably disposed within said gas channel between
30 said gas outlet and said gas inlet, a sealing ring formed at an inner circumferential surface of said gas channel, and a resilient element disposed in said gas channel for applying an urging pressure against said gas stopper to retain said gas stopper at a normal gas flowing position, wherein at said normal gas flowing position, said gas stopper is pushed by said

resilient element to move offset from said sealing ring for allowing said gas flow to pass through said gas channel to said gas outlet, and at a shut-off position, said gas stopper is moved to sit at said sealing ring for blocking said gas flow to pass through said gas channel.

5 11. The timing regulator, as recited in claim 3, wherein said safety device comprises a ball shaped gas stopper movably disposed within said gas channel between said gas outlet and said gas inlet, a sealing ring formed at an inner circumferential surface of said gas channel, and a resilient element disposed in said gas channel for applying an urging pressure against said gas stopper to retain said gas stopper at a normal gas flowing
10 position, wherein at said normal gas flowing position, said gas stopper is pushed by said resilient element to move offset from said sealing ring for allowing said gas flow to pass through said gas channel to said gas outlet, and at a shut-off position, said gas stopper is moved to sit at said sealing ring for blocking said gas flow to pass through said gas channel.

15 12. The timing regulator, as recited in claim 6, wherein said safety device comprises a ball shaped gas stopper movably disposed within said gas channel between said gas outlet and said gas inlet, a sealing ring formed at an inner circumferential surface of said gas channel, and a resilient element disposed in said gas channel for applying an urging pressure against said gas stopper to retain said gas stopper at a normal gas flowing
20 position, wherein at said normal gas flowing position, said gas stopper is pushed by said resilient element to move offset from said sealing ring for allowing said gas flow to pass through said gas channel to said gas outlet, and at a shut-off position, said gas stopper is moved to sit at said sealing ring for blocking said gas flow to pass through said gas channel.

25 13. The timing regulator, as recited in claim 9, wherein said safety device comprises a ball shaped gas stopper movably disposed within said gas channel between said gas outlet and said gas inlet, a sealing ring formed at an inner circumferential surface of said gas channel, and a resilient element disposed in said gas channel for applying an urging pressure against said gas stopper to retain said gas stopper at a normal gas flowing
30 position, wherein at said normal gas flowing position, said gas stopper is pushed by said resilient element to move offset from said sealing ring for allowing said gas flow to pass through said gas channel to said gas outlet, and at a shut-off position, said gas stopper is

moved to sit at said sealing ring for blocking said gas flow to pass through said gas channel.

14. The timing regulator, as recited in claim 1, wherein said time gear assembly further comprises a plurality of locking shafts substantially extended from said upper platform to the lower platform to lock up said upper and lower platforms to form said time gear assembly in an one piece integral member so as to securely retain said gear unit therebetween in a precise engagement manner.

15. The timing regulator, as recited in claim 4, wherein said time gear assembly further comprises a plurality of locking shafts substantially extended from said upper platform to the lower platform to lock up said upper and lower platforms to form said time gear assembly in an one piece integral member so as to securely retain said gear unit therebetween in a precise engagement manner.

16. The timing regulator, as recited in claim 9, wherein said time gear assembly further comprises a plurality of locking shafts substantially extended from said upper platform to the lower platform to lock up said upper and lower platforms to form said time gear assembly in an one piece integral member so as to securely retain said gear unit therebetween in a precise engagement manner.

17. The timing regulator, as recited in claim 13, wherein said time gear assembly further comprises a plurality of locking shafts substantially extended from said upper platform to the lower platform to lock up said upper and lower platforms to form said time gear assembly in an one piece integral member so as to securely retain said gear unit therebetween in a precise engagement manner.

18. The timing regulator, as recited in claim 14, wherein said manual time switch comprises a turning switch rotatably supported on said valve body for selecting said time frame to operate said gas valve, and a coil spring supported between said upper and lower platforms to operatively engage with said gear unit, wherein said coil spring is adapted for restoring a coil spring force against said gear unit when said turning switch is driven to rotate.

19. The timing regulator, as recited in claim 15, wherein said manual time switch comprises a turning switch rotatably supported on said valve body for selecting

said time frame to operate said gas valve, and a coil spring supported between said upper and lower platforms to operatively engage with said gear unit, wherein said coil spring is adapted for restoring a coil spring force against said gear unit when said turning switch is driven to rotate.

5 20. The timing regulator, as recited in claim 16, wherein said manual time switch comprises a turning switch rotatably supported on said valve body for selecting said time frame to operate said gas valve, and a coil spring supported between said upper and lower platforms to operatively engage with said gear unit, wherein said coil spring is adapted for restoring a coil spring force against said gear unit when said turning switch is
10 driven to rotate.

 21. The timing regulator, as recited in claim 17, wherein said manual time switch comprises a turning switch rotatably supported on said valve body for selecting said time frame to operate said gas valve, and a coil spring supported between said upper and lower platforms to operatively engage with said gear unit, wherein said coil spring is
15 adapted for restoring a coil spring force against said gear unit when said turning switch is driven to rotate.

 22. The timing regulator, as recited in claim 1, further comprising a gas extension extended from said gas discharging end of said valve body for securely and sealedly connecting to said outdoor gas apparatus, wherein said gas extension comprises
20 a gas adapter for securely connecting with a gas entrance of said outdoor gas apparatus, and a rubber made gas tube having two ends securely connecting with said gas discharging end of said valve body and said gas adapter respectively for guiding said gas flow to pass from said valve body to said outdoor gas apparatus.

 23. The timing regulator, as recited in claim 6, further comprising a gas
25 extension extended from said gas discharging end of said valve body for securely and sealedly connecting to said outdoor gas apparatus, wherein said gas extension comprises a gas adapter for securely connecting with a gas entrance of said outdoor gas apparatus, and a rubber made gas tube having two ends securely connecting with said gas discharging end of said valve body and said gas adapter respectively for guiding said gas
30 flow to pass from said valve body to said outdoor gas apparatus.

24. The timing regulator, as recited in claim 13, further comprising a gas extension extended from said gas discharging end of said valve body for securely and sealedly connecting to said outdoor gas apparatus, wherein said gas extension comprises a gas adapter for securely connecting with a gas entrance of said outdoor gas apparatus,
5 and a rubber made gas tube having two ends securely connecting with said gas discharging end of said valve body and said gas adapter respectively for guiding said gas flow to pass from said valve body to said outdoor gas apparatus.

25. The timing regulator, as recited in claim 21, further comprising a gas extension extended from said gas discharging end of said valve body for securely and sealedly connecting to said outdoor gas apparatus, wherein said gas extension comprises
10 a gas adapter for securely connecting with a gas entrance of said outdoor gas apparatus, and a rubber made gas tube having two ends securely connecting with said gas discharging end of said valve body and said gas adapter respectively for guiding said gas flow to pass from said valve body to said outdoor gas apparatus.

15 26. The timing regulator, as recited in claim 22, wherein said gas adapter has an inner threaded portion adapted for sealedly screwing with an outer threaded portion of said gas entrance of said outdoor gas apparatus for securely connecting said gas extension to said outdoor gas apparatus.

20 27. The timing regulator, as recited in claim 23, wherein said gas adapter has an inner threaded portion adapted for sealedly screwing with an outer threaded portion of said gas entrance of said outdoor gas apparatus for securely connecting said gas extension to said outdoor gas apparatus.

25 28. The timing regulator, as recited in claim 24, wherein said gas adapter has an inner threaded portion adapted for sealedly screwing with an outer threaded portion of said gas entrance of said outdoor gas apparatus for securely connecting said gas extension to said outdoor gas apparatus.

30 29. The timing regulator, as recited in claim 25, wherein said gas adapter has an inner threaded portion adapted for sealedly screwing with an outer threaded portion of said gas entrance of said outdoor gas apparatus for securely connecting said gas extension to said outdoor gas apparatus.